

WHAT IS CLAIMED IS:

1. A method for creating a three-dimensional solid freeform fabrication object with non-reactive powder comprising:  
spreading a non-reactive powder on a substrate;  
selectively dispensing a reactive resin onto said non-reactive powder, forming a mixture of reactive resin and non-reactive powder, wherein said mixture defines said three-dimensional object; and  
curing said reactive resin thereby encapsulating said non-reactive powder.
2. The method of claim 1, further comprising heating said reactive resin to a temperature of about 40 to 200 degrees Celsius (C).
3. The method of claim 1, further comprising applying ultrasonic energy to said mixture of reactive resin and non-reactive powder.
4. The method of claim 1, further comprising adding color to said reactive resin.
5. The method of claim 1, wherein said reactive resin comprises a one-part reactive resin.
6. The method of claim 5, wherein said one-part reactive resin comprises an ultraviolet (UV) curable resin.
7. The method of claim 6, wherein said curing comprises applying UV radiation to said reactive resin.

8. The method of claim 7, wherein said dispensing comprises selectively depositing a quantity of said one part reactive resin onto said non-reactive powder.

9. The method of claim 1, wherein said reactive resin comprises a two-part reactive resin including a reactive build material and a curing agent.

10. The method of claim 9, wherein said dispensing comprises: dispensing a layer of said reactive build material; and dispensing a layer of said curing agent.

11. The method of claim 9, wherein said dispensing comprises simultaneously dispensing said reactive build material and said curing agent.

12. The method of claim 9, wherein:  
said reactive build material comprises an epoxy; and  
said curing agent comprises a material from one of an amino group, a hydroxyl group, or a carboxyl group.

13. The method of claim 9, wherein:  
said reactive build material comprises a polyisocyanate; and  
said curing agent comprises a polyol.

14. The method of claim 9, wherein:  
said reactive build material comprises a functionalized silicone; and  
said curing agent is configured to react with a functional group on said silicone.

15. The method of claim 9, wherein:  
said reactive build material comprises prepolymers with unsaturated functionality; and  
said curing agent comprises a free-radical cure curing agent.

16. The method of claim 1, wherein said reactive resin comprises a two-part UV curable resin including a UV initiator and a build material.

17. The method of claim 16, wherein said selectively dispensing comprises:  
dispensing a layer of build material on said non-reactive powder; and  
dispensing a layer of said UV initiator.

18. The method of claim 16, wherein said selectively dispensing comprises simultaneously dispensing said build material and said UV initiator.

19. The method of claim 16, wherein said UV initiator is dissolved in a solvent.

20. The method of claim 19, wherein said solvent comprises a monofunctional monomer.

21. The method of claim 16, wherein said build material comprises one of an acrylic compound, a compound having an epoxy substituent, a vinyl ether substituent, vinylcaprolactam, vinylpyrrolidone, or urethanes.

22. The method of claim 16, wherein said UV initiator comprises one of a free radical initiator or a cationic initiator.

23. The method of claim 1, wherein said non-reactive powder comprises one of silica particles, glass spheres, metal powders, polymer powders, ceramic powders, or magnetic powders.

24. A solid freeform fabrication system for producing a three-dimensional object using non-reactive powder comprising:

a powder spreading system configured to spread a specified quantity of non-reactive powder;

a dispensing system adapted to selectively dispense a reactive resin onto said non-reactive powder;

a curing system configured to cure said reactive resin; and

a computing device coupled to and configured to control said dispensing system and said curing system.

25. The solid freeform fabrication system of claim 24, wherein said powder spreading system comprises a mechanical roller.

26. The solid freeform fabrication system of claim 25, wherein said mechanical roller is configured to planarize and pack a quantity of said non-reactive powder.

27. The solid freeform fabrication system of claim 24, wherein said dispensing system comprises an inkjet dispenser.

28. The solid freeform fabrication system of claim 27, wherein said inkjet dispenser comprises one of a thermal inkjet dispenser, a continuous inkjet dispenser, or a piezoelectric inkjet dispenser.

29. The solid freeform fabrication system of claim 27, wherein said inkjet dispenser comprises a plurality of ejection orifices configured to selectively eject parts of a two-part reactive resin.

30. A solid freeform fabrication system for producing a three-dimensional object using non-reactive powder comprising:

spreading means for spreading said non-reactive powder;

dispensing means for dispensing a reactive resin onto said non-reactive powder;

curing means for curing said reactive resin; and

controlling means for controlling said spreading means, said dispensing means, and said curing means.

31. The solid freeform fabrication system of claim 30, wherein said spreading means comprises one of a blade or a mechanical roller.

32. The solid freeform fabrication system of claim 30, wherein said dispensing means comprises a thermal inkjet dispenser.

33. The solid freeform fabrication system of claim 30, wherein said dispensing means comprises one of a piezoelectric inkjet dispenser or a continuous inkjet dispenser.

34. The solid freeform fabrication system of claim 30, wherein said curing means comprises a heater.

35. The solid freeform fabrication system of claim 30, wherein said curing means comprises a UV radiation applicator.

36. The solid freeform fabrication system of claim 30, wherein said controlling means comprises a computer.

37. An object created by solid freeform fabrication comprising:  
a cured reactive resin; and  
a non-reactive powder contained within said cured reactive resin.

38. The object of claim 37, wherein said cured reactive resin was jetted onto said non-reactive powder by an inkjet dispenser.

39. The object of claim 37, wherein said non-reactive powder was spread in bulk onto a substrate prior to receiving said reactive resin.

40. The object of claim 37, wherein said cured reactive resin comprises a one-part reactive resin.

41. The object of claim 40, wherein said one-part reactive resin further comprises a UV curable resin.

42. The object of claim 37, wherein said cured reactive resin comprises a two-part reactive resin.

43. The object of claim 37, wherein said cured reactive resin comprises a two-part UV curable resin.

44. The object of claim 37, wherein said object further comprises a three-dimensional object.

45. A processor readable medium having instructions thereon for:  
receiving data corresponding to a SFF build operation;  
causing a roller to spread and pack a layer of non-reactive powder on a substrate;  
selectively firing a curable resin from a dispenser onto said non-reactive powder; and  
curing said curable resin.

46. The processor readable medium of claim 45, further comprising instructions for applying ultrasonic energy to said resin and non-reactive powder.

47. The processor readable medium of claim 46, wherein said dispenser comprises an inkjet dispenser.

48. The processor readable medium of claim 46, wherein said resin comprises a one-part reactive material.

49. The processor readable medium of claim 46, wherein said resin comprises a two-part reactive material.